WATER QUALITY MONITORING DATA

SOUTHWESTERN REGION

1978–1979

MARCH, 1981

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Ministry
of the
Environment

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Water Quality Monitoring Data
Southwestern Region
1978-1979

Water Resources Assessment Unit
Technical Support Section

March, 1981

Ministry of the Environment

INTRODUCTION

Since the mid-1960's, the Ministry of the Environment and its predecessor, the Ontario Water Resources Commission, have been monitoring the water quality of many streams and rivers throughout the Province. The monitoring program consists of visiting pre-selected stream locations carrying out some analyses on-site (e.g. temperature, dissolved oxygen) and collecting water samples for subsequent physical, chemical and bacteriological analyses at one of the Ministry of the Environment's laboratories. The field work is carried out partly by Ministry staff and partly by staff of local Conservation Authorities.

In the Southwestern Region of the Ministry, about 130 stream locations are presently monitored. With some exceptions, visits to each monitoring location are made about once per month.

All data obtained through the water quality monitoring program are available to the public on request.

Although the data are routinely used to assess stream problems and to assess the degree of compliance with Ministry criteria, the only previous assembly of data in the Southwestern Region has been for specific water basin studies. In 1980, the Ministry received funding approval for an Experience '80 program to summarize and illustrate the water quality data using 1978 and 1979 data. Although many physical, chemical and bacteriological analyses are carried out, only six of the more important parameters were selected for this report: total phosphorus, filtered reactive phosphorus, ammonia, five-day biochemical oxygen demand, fecal coliform bacteria and suspended solids. Data have been assembled to demonstrate seasonal (May to October) concentrations of total phosphorus and filtered reactive phosphorus.

The attached maps illustrate the stream monitoring locations in 1978 and 1979 for which the data are outlined and discussed. These maps also provide a list of sampling station locations relating the map numbers and locations to the complete reference code for each location. The reference code is required to access the complete record of data for a particular station.

The majority of monitoring stations have in the order of ten to twelve measurements annually for each of the six parameters including measurements of all seasons of the year.

This report will serve several purposes including (a) establishing problem areas which warrant attention, (b) supplying a reference or baseline for comparisons with future water quality measurements and (c) identifying the streams having high quality that are deserving of protection.

PRECAUTIONS IN DATA INTERPRETATION

Although this report provides a general indication of the water quality of streams in the Southwestern Region of the Ministry, it is very important that the reader understand the following two precautions in interpreting the material presented.

1. The monitoring program can be effectively used to detail only a part of the overall stream water quality. The program has historically emphasized traditional water quality concerns such as oxygen-consuming organ-

ics, nutrients, dissolved oxygen and turbidity. There are many other potential contaminants affecting stream quality including pesticides, persistent organics (e.g. PCBs, various chlorinated and aromatic hydrocarbons) and heavy metals such as mercury that are not addressed by this report. Investigations of such substances are usually conducted where a specific type of discharge or spill incident warrants attention to them.

2. The stream monitoring program does not representatively depict stream quality throughout the region. For example, there is a high representation of stations just downstream from treated waste inputs such as sewage treatment plants for municipalities or industries so that the Ministry can monitor impacts. As well, many stream sampling locations are at stream mouths where water quality tends to be poor compared to that of headwater areas.

DATA PRESENTATION

In the following review, several references will be made to the "Water Management Objectives" of the Ministry. These Objectives are outlined in detail in the November, 1978 publication entitled "Water Management - Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment". Where possible, the data presented are related to the Objectives of the Ministry in the Water Management booklet.

PHOSPHORUS

In general, phosphorus levels are lowest in the northern part of the region and highest in the southern part of the region.

According to the Ministry's Objectives "excessive plant growth in the rivers and streams should be eliminated at a total phosphorus concentration of 30 ug/l". More than 80% of the monitoring stations had annual average total phosphorus concentrations exceeding this 30 ug/l figure; hence, many stream areas would theoretically be expected to support a heavy growth of aquatic plants. In fact, field observations have revealed that while aquatic plants do flourish in some nutrient-enriched stream areas (e.g. Avon River), the growth may be limited because of lack of suitable substrate, stream bed scouring, turbidity or seasonal fluctations (e.g. high nutrient concentrations during spring runoff only).

The stations with the highest phosphorus concentrations were generally downstream from urban or industrial sources. For example, the City of Windsor and Chrysler Corporation of Canada contribute to high total and filtered reactive phosphorus levels in Turkey Creek. The Palmerston sewage treatment plant produces high effluent phosphorus concentrations which adversely impacts the headwaters of the Little Maitland River. The Ford Motor Company completed a new sewage treatment plant in 1980 which has recently improved the quality of Dodd Creek. Phosphorus levels are also elevated by agricultural runoff in many parts of the region, most notably the southern area which is farmed intensively. The lowest phosphorus concentrations are generally found in headwater streams such as tributaries to the Saugeen and Beaver Rivers.

AMMONIA

Ammonia levels tend to be favorably low throughout most of the Southwestern Region.

The main environmental concern over elevated ammonia levels relates to its potential for toxicity to aquatic life. The un-ionized portion of the ammonia is the toxic fraction and the degree of ionization is temperature and pH dependent. As per the Ministry's water management Objectives, the "concentration of un-ionized ammonia should not exceed 0.02 mg/l". A review of the five stations with the highest free ammonia concentrations indicated that Turkey Creek and Little River, both in Windsor, had un-ionized ammonia concentrations in excess of the Ministry Objective for more than half the samples in 1978 and 1979. The maximum concentration was 0.40 mg/l for Turkey Creek and 0.105 mg/l for the Little River. The Little Maitland River downstream from Palmerston had 4 out of 11 samples in 1979 exceeding the Objective. The maximum concentration noted was 0.055 mg/l.

Since there was little pH data collected in 1978, it is not possible to assess the toxicity of ammonia at most stations. In 1979, however, only those stations noted above had more than 1 or 2 samples that violated the Objective.

FIVE DAY BIOCHEMICAL OXYGEN DEMAND (BOD_5)

In general, levels of BOD_5 tended to be favourably low in the northern parts of the region and elevated in the more urbanized and intensively farmed areas of the southern part of the Region.

BOD_5 is a measure of the oxygen-consuming power of materials in the water. It is desirable to maintain BOD_5 levels as low as possible so that oxygen levels remain at satisfactory conditions to support aquatic life.

The stations with the highest annual average BOD_5 include Turkey Creek, Muddy Creek, Dodd Creek, Hickory Creek and the Thames River upstream from Tavistock. Muddy Creek is influenced by Omstead Foods Limited at Wheatley. One sample upstream from Tavistock had a BOD_5 of 72 mg/l which raised the average considerably. No explanation for this high concentration is available. The November 1978 data from Hickory Creek showed a BOD_5 concentration of 41 mg/l. This may have been caused by the Forest lagoon which is discharged on a seasonal basis. The reasons for poor quality at the other stations have been discussed earlier in the phosphorus section.

The BOD_5 concentrations are also elevated downstream from other urban centres, as well as in many rural areas in the southern portion of the region.

The lowest BOD_5 levels were recorded in rivers in the northern part of the region which have little influence from agricultural or urban sources. These include the Saugeen, Beaver and Sauble Rivers and several smaller streams.

FECAL COLIFORM

Levels of fecal coliforms were, in general, low at most of the monitoring stations, in the northern part of the region. A number of locations in the populated southern end of the region, however, did have elevated fecal coliform levels. The Woodstock-London-St. Thomas triangle had higher levels, as did the stations in Essex County. This can be attributed to several sources including storm drainage, sanitary sewer bypassing, and possibly illegal connections from farm operations to field tile systems. Cattle access to streams and inadequate agricultural waste handling practices on a seasonal basis are also influential in elevating bacterial levels.

The areas of lowest bacterial contamination include the mouth of the Lucknow River, Beaver River (Feversham), Maitland River (Goderich), Maitland River (Wingham), Sharpe's Creek, the Sauble River, South Saugeen River, Spring Creek and the Saugeen River upstream from Durham.

The Provincial Water Quality Objective relating to the swimming and bathing use of water states that "a potential health hazard exists if the fecal coliform geometric mean density exceeds 100/100 ml". At a majority of monitoring locations in the more populated part of the region, this Objective is not met. A real potential health hazard only exists if the streams at these locations are used for swimming and bathing.

SUSPENDED SOLIDS

In general, average levels of suspended solids were low in the northern part of the region and elevated at most locations in the southern part of the region.

High concentrations of suspended solids which produce stream turbidity resulted from a wide variety of active land disturbances (road construction, urban construction, stream channelization, agricultural activity). Because stream turbidity problems are often temporary, the locations of the problem areas vary considerably from one time period to the next.

Elevated stream turbidity can result in a wide variety of ecological and human use problems, including (a) the blanketing of fish spawning beds, (b) destruction of benthic invertebrates, (c) aesthetic depreciation, and (d) the clogging of irrigation systems. A considerably greater emphasis on soil erosion control is necessary to prevent these adverse affects.

GENERAL DISCUSSION

The water quality data revealed that in general, stream water quality is closely linked with population density and intensity of agricultural activity. The sparsely populated northern part of the region tends to have good stream quality, while the more densely populated and heavily farmed southern part of the region has poorer stream quality. More specifically, the water quality in several cases can be related to the effluent discharges from sewage treatment plants.

The attached station maps illustrate those monitoring stations at which one or more of the six parameters fell within the five "worst" or five "best" documented each year.

The poorest overall water quality was recorded on the Little Maitland River (Palmerston), Dodd Creek (Talbotville), Decker Creek (Thedford), Turkey Creek (Windsor) and Muddy Creek at Wheatley. The Palmerston sewage treatment plant has produced a poor quality effluent for several years, but the Ministry is actively pursuing remedial action to improve the treatment of Palmerston's sewage. The poor quality in Dodd Creek can be attributed to the discharge from the waste water treatment plant serving the Ford Motor Company Plant at Talbotville. The Company completed a new treatment facility in 1980 which improved the stream quality during the latter part of the year. Water quality at Thedford improved from 1978 to 1979 with the recent completion of a sanitary sewage collection and treatment system (lagoons). A report on the water quality of Turkey Creek was prepared by the Water Resources Assessment Unit staff in 1979. The City of Windsor has a sewer separation program in progress which should result in improved water quality in the future

in Turkey Creek. Omstead Foods Limited discharge fish processing wastes into Muddy Creek which flows into Wheatley Harbour. The Windsor District Industrial Abatement staff are working with the industry to improve the quality of their effluent.

The best water quality was recorded on the South Saugeen (Mount Forest), Maitland River (Goderich), Lucknow River (Port Albert), Saugeen River (Durham), Rocky Saugeen (Markdale), Spey River (Chatsworth), Sydenham River (Inglis Falls), Albemarle Brook and Sharpe's Creek (Benmiller). The Mount Forest sewage treatment plant is upstream from the monitoring station on the South Saugeen, but does not appear to be adversely affecting water quality. The Markdale lagoons are being converted from a seasonal discharge to an exfiltration system to minimize the impact on the Rocky Saugeen River. The aerated lagoon at Durham is being replaced by a secondary sewage treatment facility which will reduce the present impact of Durham on the Saugeen River so that the high water quality observed upstream should continue further down the watershed.

ACKNOWLEDGEMENT

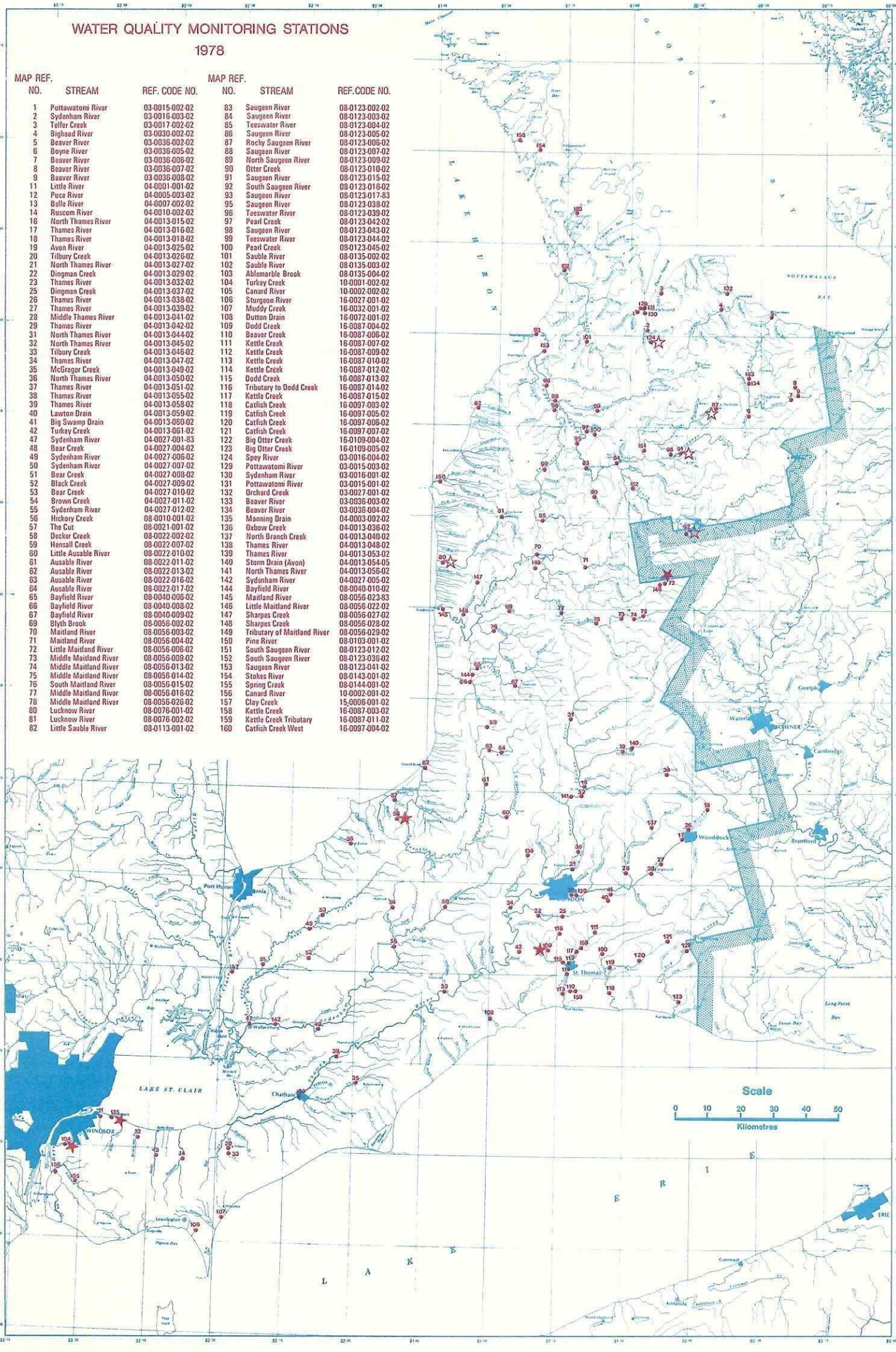
Staff of the Water Resources Assessment Unit, Southwestern Region wish to acknowledge the assistance of Miss Barbara Laur, an Experience '80 student in the preparation of the maps for this report. As well, appreciation is expressed to staff of the Hydrology and Monitoring Section, Water Resources Branch for a computer summary of the data. Without the assistance of field staff from several Conservation Authorities in the collection of samples, the data base for this report would have been much more limited.

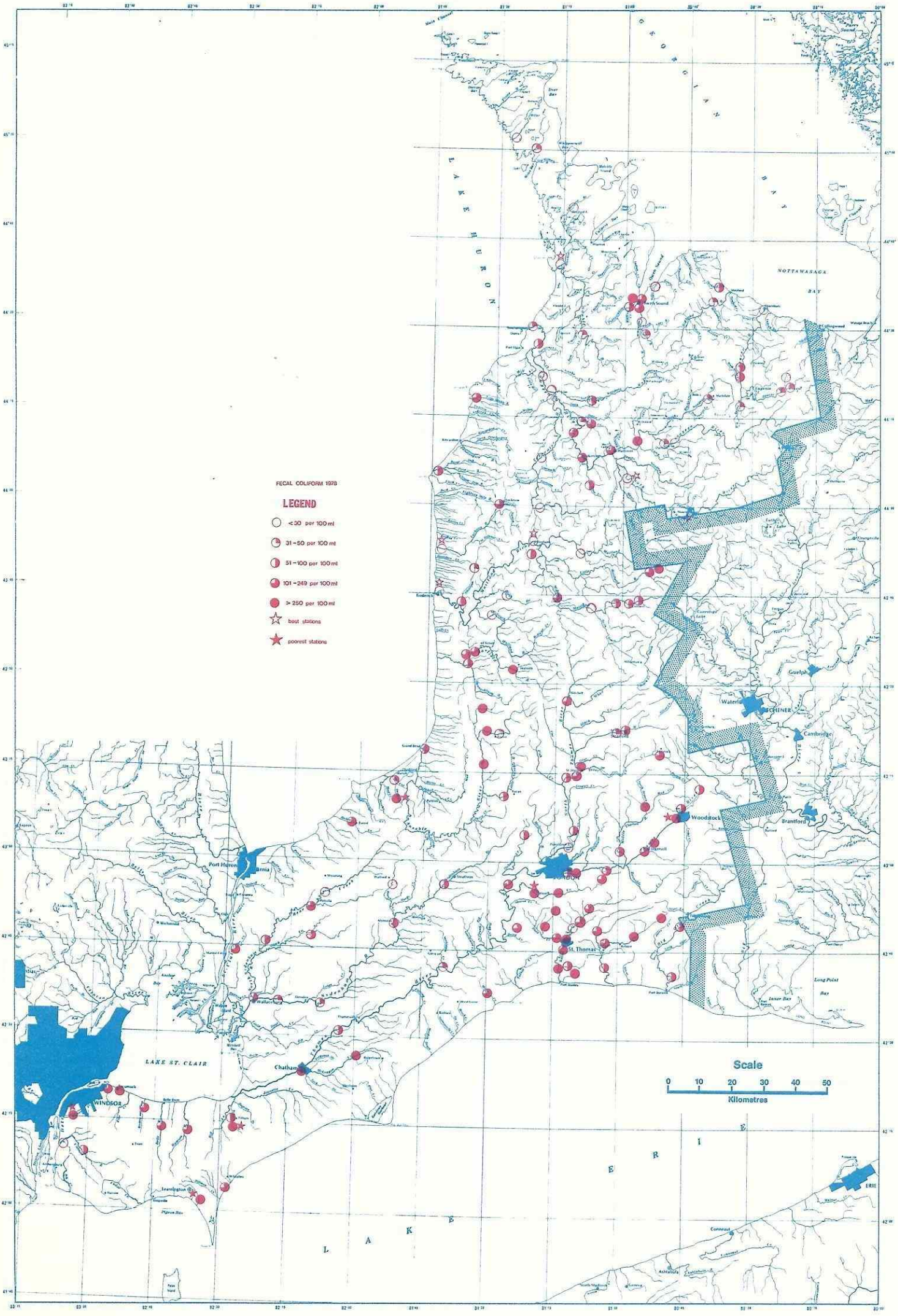
MAP LIST

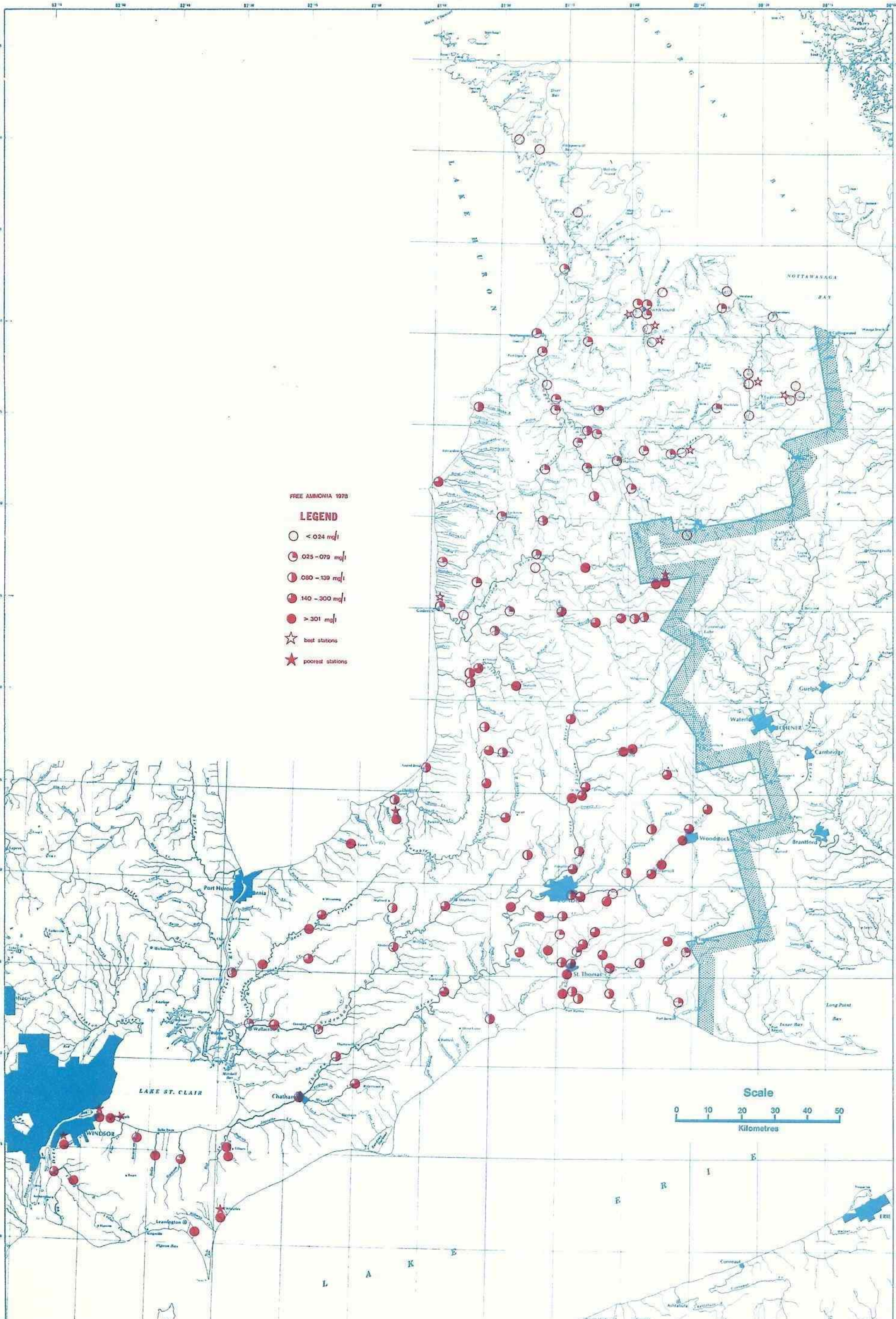
1978	Monitoring stations
1978	Five-day biochemical oxygen demand (BOD_5)
1978	Fecal coliform
1978	Free ammonia
1978	Total phosphorus
1978	Suspended solids
1978	Filtered reactive phosphorus
1978	May to October total phosphorus
1978	May to October filtered reactive phosphorus
1979	Monitoring stations
1979	BOD_5
1979	Fecal coliform
1979	Free ammonia
1979	Total phosphorus
1979	Suspended solids
1979	Filtered reactive phosphorus
1979	May to October total phosphorus
1979	May to October filtered reactive phosphorus

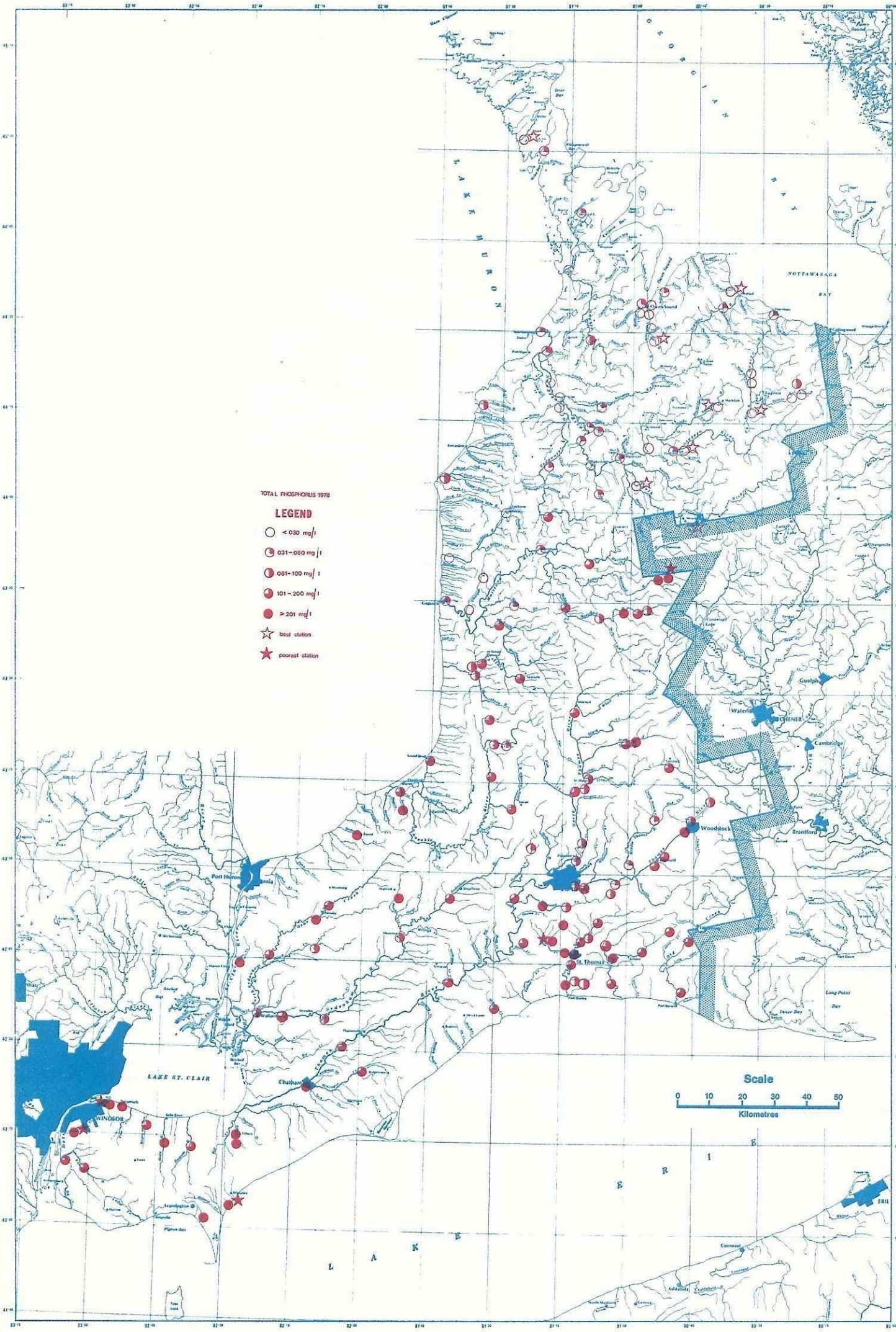
WATER QUALITY MONITORING STATIONS
1978

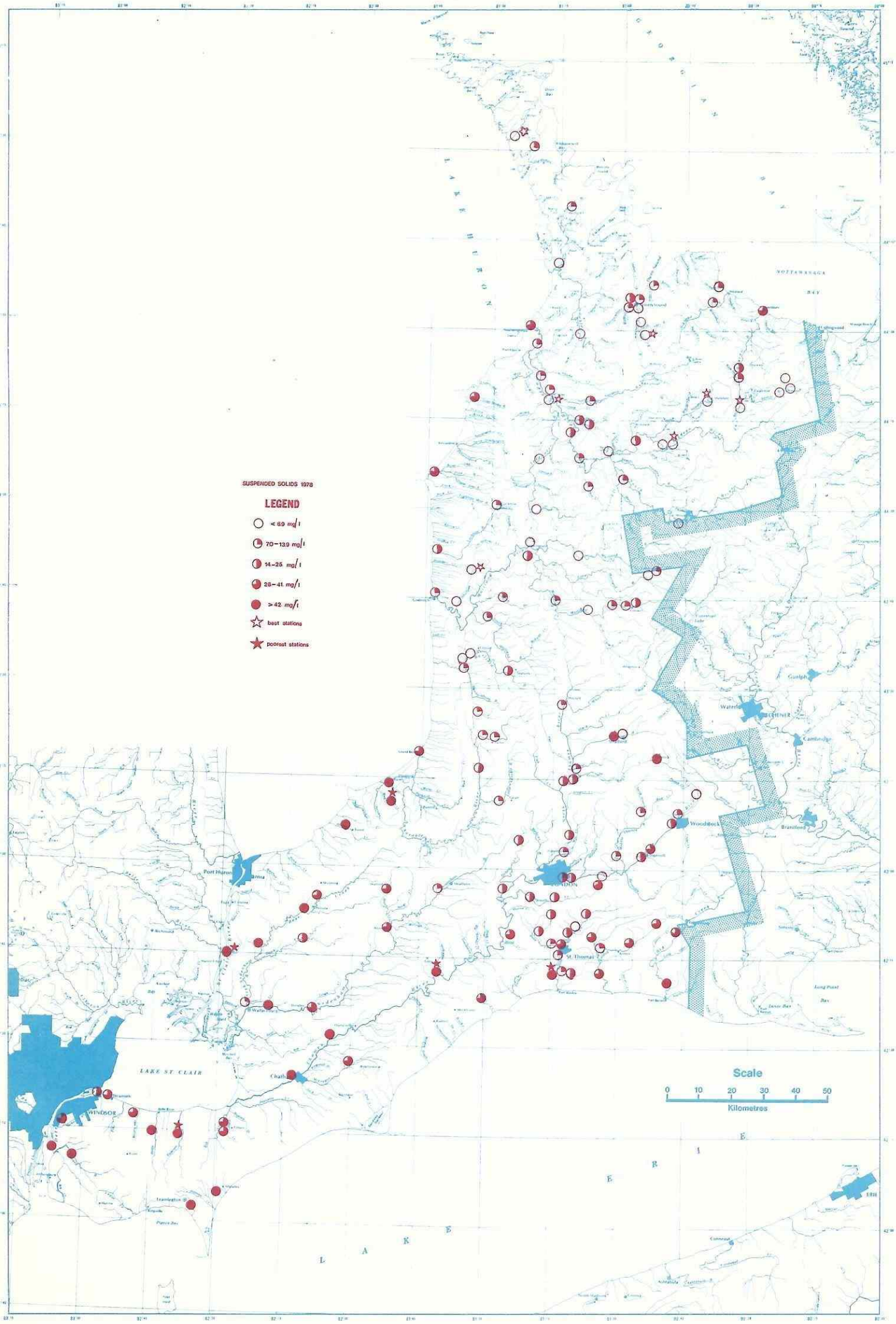
MAP REF. NO.	STREAM	REF. CODE NO.
1	Pottawatomi River	03-0015-002-02
2	Sydenham River	03-0016-003-02
3	Telfer Creek	03-0017-002-02
4	Bighead River	03-0030-002-02
5	Beaver River	03-0036-002-02
6	Boyne River	03-0036-005-02
7	Beaver River	03-0036-006-02
8	Beaver River	03-0036-007-02
9	Beaver River	03-0036-008-02
11	Little River	04-0001-001-02
12	Puce River	04-0005-003-02
13	Belle River	04-0007-002-02
14	Ruscom River	04-0010-002-02
16	North Thames River	04-0013-015-02
17	Thames River	04-0013-016-02
18	Thames River	04-0013-018-02
19	Avon River	04-0013-025-02
20	Tilbury Creek	04-0013-026-02
21	North Thames River	04-0013-027-02
22	Dingman Creek	04-0013-029-02
23	Thames River	04-0013-032-02
25	Dingman Creek	04-0013-037-02
26	Thames River	04-0013-038-02
27	Thames River	04-0013-039-02
28	Middle Thames River	04-0013-041-02
29	Thames River	04-0013-042-02
31	North Thames River	04-0013-044-02
32	North Thames River	04-0013-045-02
33	Tilbury Creek	04-0013-046-02
34	Thames River	04-0013-047-02
35	McGregor Creek	04-0013-049-02
36	North Thames River	04-0013-050-02
37	Thames River	04-0013-051-02
38	Thames River	04-0013-055-02
39	Thames River	04-0013-058-02
40	Lawton Drain	04-0013-059-02
41	Big Swamp Drain	04-0013-060-02
42	Turkey Creek	04-0013-061-02
47	Sydenham River	04-0027-001-83
48	Bear Creek	04-0027-004-02
49	Sydenham River	04-0027-006-02
50	Sydenham River	04-0027-007-02
51	Bear Creek	04-0027-008-02
52	Black Creek	04-0027-009-02
53	Bear Creek	04-0027-010-02
54	Brown Creek	04-0027-011-02
55	Sydenham River	04-0027-012-02
56	Hickory Creek	08-0010-001-02
57	The Cut	08-0021-001-02
58	Decker Creek	08-0022-002-02
59	Hensall Creek	08-0022-007-02
60	Little Ausable River	08-0022-010-02
61	Ausable River	08-0022-011-02
62	Ausable River	08-0022-013-02
63	Ausable River	08-0022-016-02
64	Ausable River	08-0022-017-02
65	Bayfield River	08-0040-006-02
66	Bayfield River	08-0040-008-02
67	Bayfield River	08-0040-009-02
69	Blyth Brook	08-0056-002-02
70	Maitland River	08-0056-003-02
71	Maitland River	08-0056-004-02
72	Little Maitland River	08-0056-006-02
73	Middle Maitland River	08-0056-009-02
74	Middle Maitland River	08-0056-013-02
75	Middle Maitland River	08-0056-014-02
76	South Maitland River	08-0056-015-02
77	Middle Maitland River	08-0056-016-02
78	Middle Maitland River	08-0056-026-02
80	Lucknow River	08-0076-001-02
81	Lucknow River	08-0076-002-02
82	Little Sauble River	08-0113-001-02
83	Saugeen River	08-0123-002-02
84	Saugeen River	08-0123-003-02
85	Teeswater River	08-0123-004-02
86	Saugeen River	08-0123-005-02
87	Rocky Saugeen River	08-0123-006-02
88	Saugeen River	08-0123-007-02
89	North Saugeen River	08-0123-009-02
90	Otter Creek	08-0123-010-02
91	Saugeen River	08-0123-015-02
92	South Saugeen River	08-0123-016-02
93	Saugeen River	08-0123-017-83
95	Saugeen River	08-0123-038-02
96	Teeswater River	08-0123-039-02
97	Pearl Creek	08-0123-042-02
98	Saugeen River	08-0123-043-02
99	Teeswater River	08-0123-044-02
100	Pearl Creek	08-0123-045-02
101	Sauble River	08-0135-002-02
102	Sauble River	08-0135-003-02
103	Ablemarble Brook	08-0135-004-02
104	Turkey Creek	10-0001-002-02
105	Canard River	10-0002-002-02
106	Sturgeon River	16-0027-001-02
107	Muddy Creek	16-0032-001-02
108	Dutton Drain	16-0072-001-02
109	Dodd Creek	16-0087-004-02
110	Beaver Creek	16-0087-006-02
111	Kettle Creek	16-0087-007-02
112	Kettle Creek	16-0087-009-02
113	Kettle Creek	16-0087-010-02
114	Kettle Creek	16-0087-012-02
115	Dodd Creek	16-0087-013-02
116	Tributary to Dodd Creek	16-0087-014-02
117	Kettle Creek	16-0087-015-02
118	Catfish Creek	16-0097-003-02
119	Catfish Creek	16-0097-005-02
120	Catfish Creek	16-0097-006-02
121	Catfish Creek	16-0097-007-02
122	Big Otter Creek	16-0109-004-02
123	Big Otter Creek	16-0109-005-02
124	Spey River	03-0016-004-02
129	Pottawatomi River	03-0015-003-02
130	Sydenham River	03-0016-001-02
131	Pottawatomi River	03-0015-001-02
132	Orchard Creek	03-0027-001-02
133	Beaver River	03-0036-003-02
134	Beaver River	03-0036-004-02
135	Manning Drain	04-0003-002-02
136	Oxbow Creek	04-0013-036-02
137	North Branch Creek	04-0013-040-02
138	Thames River	04-0013-048-02
139	Thames River	04-0013-053-02
140	Storm Drain (Avon)	04-0013-054-05
141	North Thames River	04-0013-056-02
142	Sydenham River	04-0027-005-02
144	Bayfield River	08-0040-010-02
145	Maitland River	08-0056-023-83
146	Little Maitland River	08-0056-022-02
147	Sharpes Creek	08-0056-027-02
148	Sharpes Creek	08-0056-028-02
149	Tributary of Maitland River	08-0056-029-02
150	Pine River	08-0103-001-02
151	South Saugeen River	08-0123-012-02
152	South Saugeen River	08-0123-036-02
153	Saugeen River	08-0123-041-02
154	Stokes River	08-0143-001-02
155	Spring Creek	08-0144-001-02
156	Canard River	10-0002-001-02
157	Clay Creek	15-0006-001-02
158	Kettle Creek	16-0087-003-02
159	Kettle Creek Tributary	16-0087-011-02
160	Catfish Creek West	16-0097-004-02

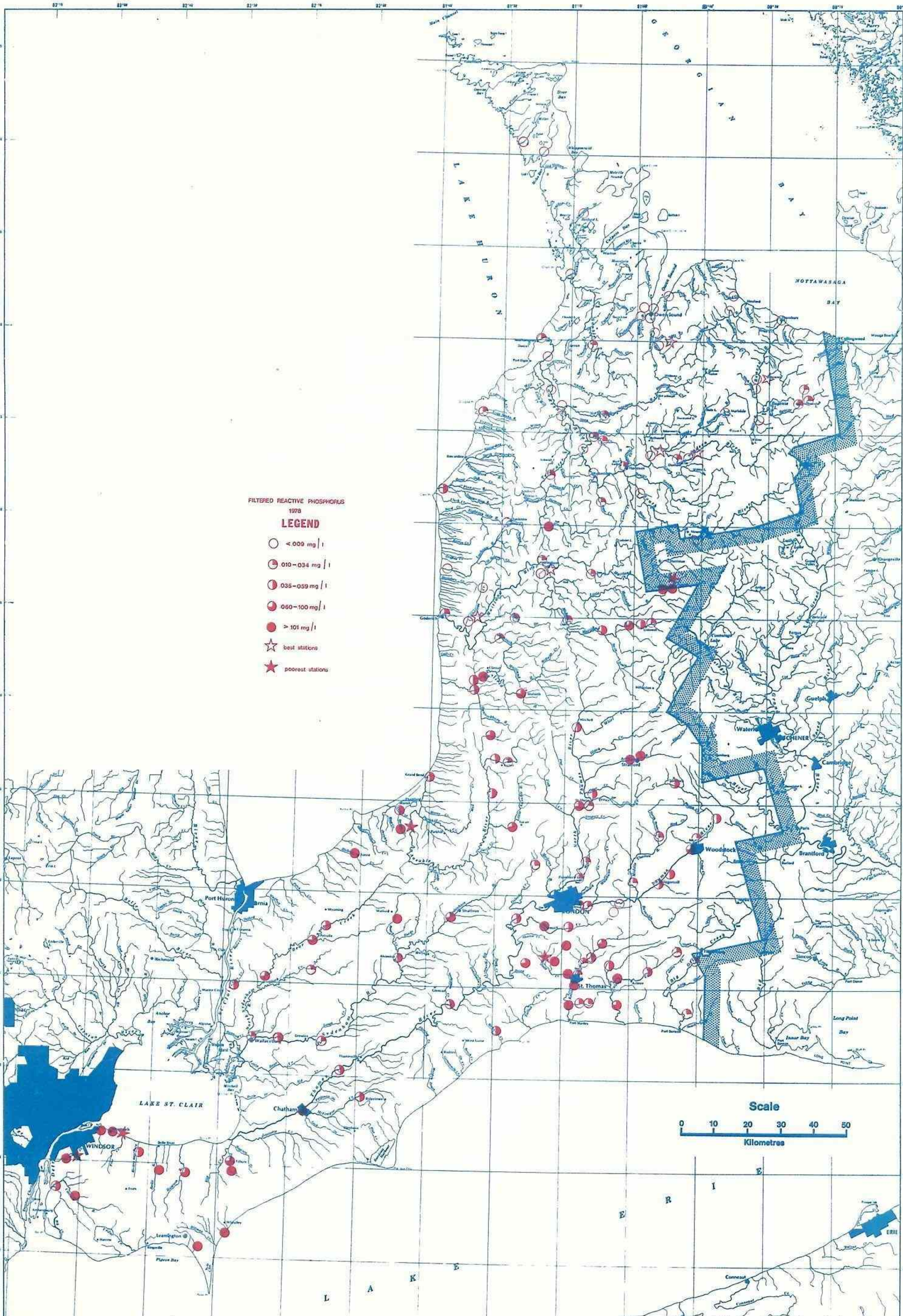


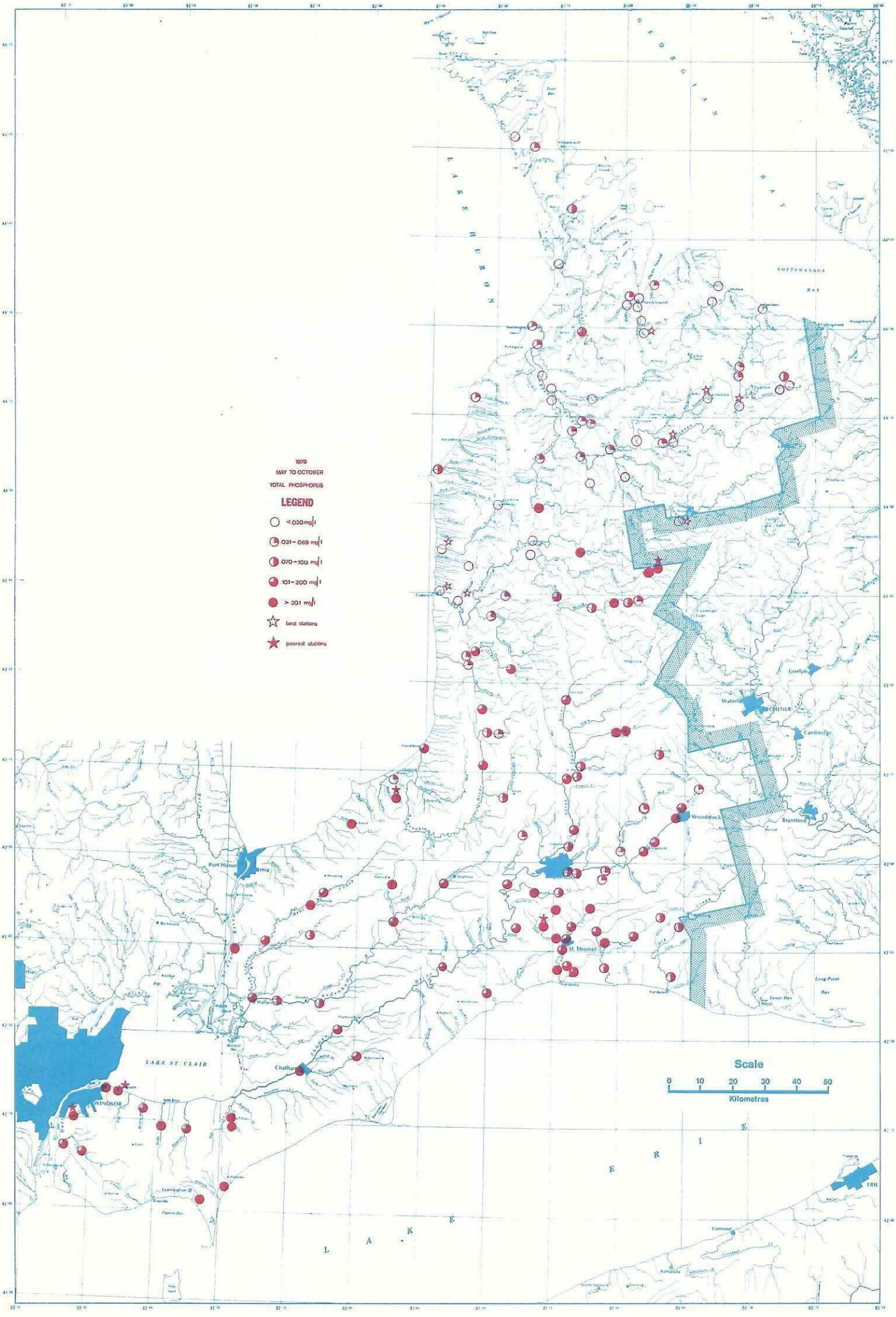

FECAL COLIFORM 1978
LEGEND
< 30 per 100 ml
31 - 50 per 100 ml
51 - 100 per 100 ml
101 - 249 per 100 ml
> 250 per 100 ml
best stations
poorest stations
LAKE HURON
GEORGIAN BAY
NOTTAWASAGA BAY
LAKE ST. CLAIR
LAKE ERIE
Port Huron
Sarnia
WINDSOR
Chatham
LONDON
St. Thomas
Woodstock
Brantford
Guelph
Waterloo
KITCHENER
Cambridge
Long Point Bay
Inner Bay
ERIE
Conneaut
Ashtabula
Scale
0 10 20 30 40 50
Kilometres

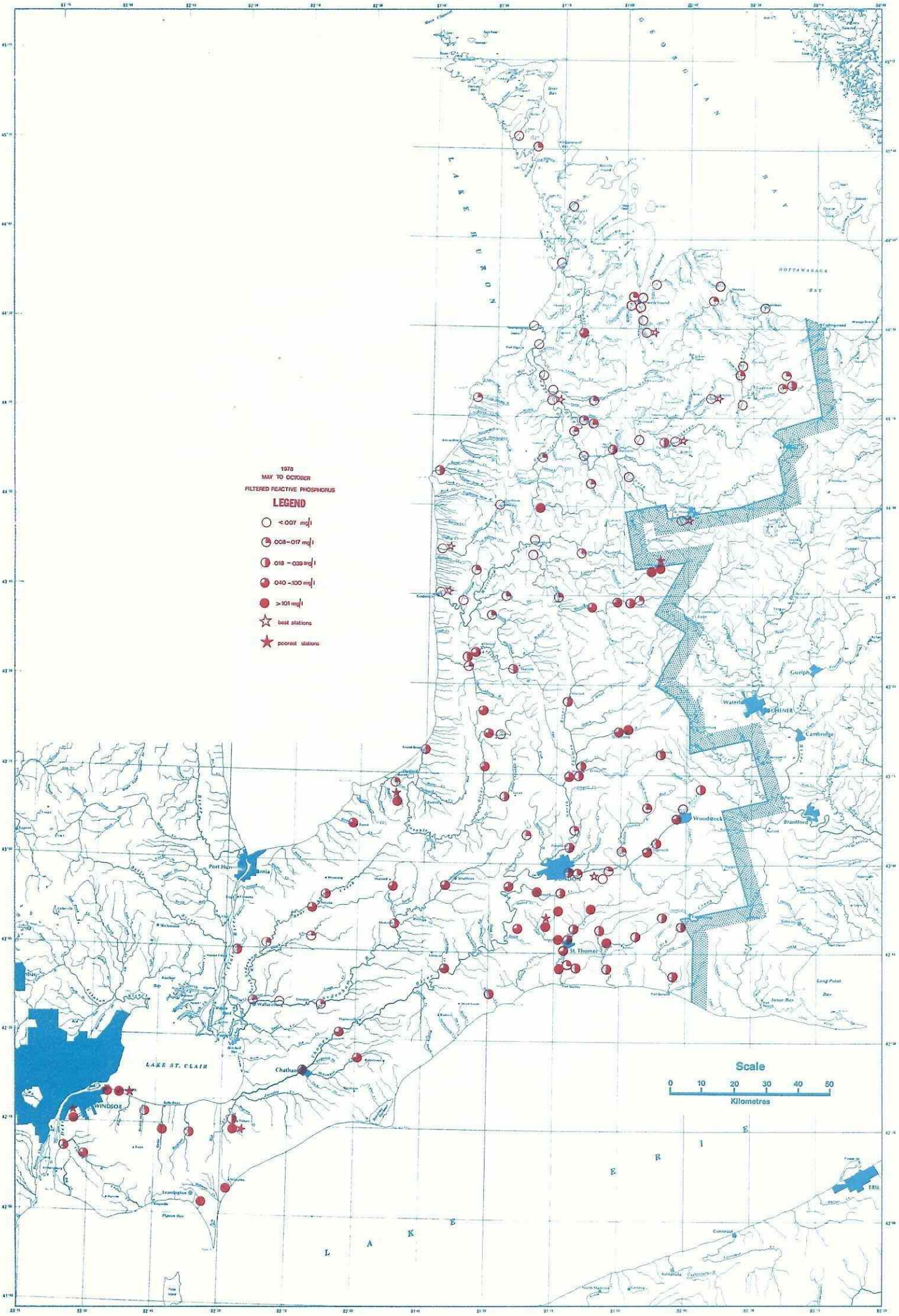

FREE AMMONIA 1978
LEGEND
< .024 mg/l
.025 – .079 mg/l
.080 – .139 mg/l
.140 – .300 mg/l
> .301 mg/l
best stations
poorest stations
Scale
0 10 20 30 40 50
Kilometres
LAKE HURON
GEORGIAN BAY
NOTTAWASAGA BAY
LAKE ST. CLAIR
LAKE ERIE
Guelph
Waterloo
KITCHENER
Cambridge
Woodstock
Brantford
St. Thomas
Chatham
WINDSOR
Leamington
Port Huron
Sarnia
Goderich
Long Point Bay
Inner Bay
Pigeon Bay
ERIE


TOTAL PHOSPHORUS 1978
LEGEND
<.030 mg/l
.031-.060 mg/l
.061-.100 mg/l
.101-.200 mg/l
>.201 mg/l
best station
poorest station
GEORGIAN BAY
NOTTAWASAGA BAY
Guelph
Waterloo
KITCHENER
Cambridge
Brantford
Woodstock
St. Thomas
Long Point Bay
Port Huron
Sarnia
LAKE ST. CLAIR
Chatham
WINDSOR
Leamington
Pigeon Bay
Scale
0 10 20 30 40 50
Kilometres
ERIE
Conneaut
Ashtabula
LAKE ERIE


SUSPENDED SOLIDS 1978
LEGEND
< 6.9 mg/l
7.0 – 13.9 mg/l
14 – 25 mg/l
26 – 41 mg/l
> 42 mg/l
best stations
poorest stations
Scale
0 10 20 30 40 50
Kilometres
LAKE ST CLAIR
WINDSOR
LAKE ERIE
Port Huron
Sarnia
Chatham
Guelph
Waterloo
KITCHENER
Cambridge
Woodstock
Brantford
St. Thomas
Long Point Bay
Tillsonburg
Port Burwell
Nottawasaga Bay


FILTERED REACTIVE PHOSPHORUS
1978
LEGEND
< .009 mg / l
.010–.034 mg / l
.035–.059 mg / l
.060–.100 mg / l
> .101 mg / l
best stations
poorest stations
LAKE HURON
GEORGIAN BAY
NOTTAWASAGA BAY
LAKE ST. CLAIR
LAKE ERIE
Owen Sound
Guelph
Waterloo
KITCHENER
Cambridge
Woodstock
Brantford
Stratford
LONDON
St. Thomas
Port Huron
Sarnia
Wallaceburg
Chatham
WINDSOR
Leamington
Pigeon Bay
Long Point Bay
Inner Bay
Collingwood
ERIE
Conneaut
Ashtabula
Scale
0 10 20 30 40 50
Kilometres


1978
MAY TO OCTOBER
TOTAL PHOSPHORUS
LEGEND
<0.030 mg/l
.031 - .069 mg/l
.070 - .100 mg/l
.101 - .200 mg/l
> .201 mg/l
best stations
poorest stations
Scale
0 10 20 30 40 50
Kilometres
LAKE ST CLAIR
WINDSOR
Chatham
St. Thomas
Woodstock
Brantford
Guelph
Cambridge
Waterloo
KITCHENER
Port Huron
Sarnia
London
Long Point Bay
Inner Bay
Nottawasaga Bay
Georgian Bay
HURON
ERIE
LAKE
Leamington
Kingsville
Pelee Island
Port Dover
Simcoe
Tillsonburg
Delhi
Ingersoll
Woodstock
Stratford
Listowel
Wingham
Walkerton
Owen Sound
Meaford
Collingwood
Wasaga Beach
Barrie
Orillia
Midland
Penetanguishene
Parry Sound
Bracebridge
Gravenhurst
Huntsville
Bala
Port Carling
Muskoka Lakes
Lake Rosseau
Lake Joseph
Lake of Bays
Dwight
Dorset
Minden
Haliburton
Bancroft
Madoc
Belleville
Trenton
Picton
Brighton
Cobourg
Port Hope
Peterborough
Lindsay
Omemee
Bobcaygeon
Fenelon Falls
Kirkfield
Uxbridge
Stouffville
Markham
Richmond Hill
Aurora
Newmarket
Georgina
Keswick
Sutton
Jackson's Point
Beaverton
Port Perry
Whitby
Oshawa
Ajax
Pickering
Scarborough
Toronto
Mississauga
Oakville
Burlington
Hamilton
Dundas
Ancaster
Waterdown
Grimsby
St. Catharines
Niagara Falls
Welland
Port Colborne
Fort Erie
Niagara-on-the-Lake
Queenston
Lewiston
Youngstown
Wilson
Olcott
Newfane
Lockport
Medina
Albion
Brockport
Spencerport
Rochester
Webster
Irondequoit
Penfield
Pittsford
Fairport
Victor
Canandaigua
Naples
Honeoye Falls
Mendon
Avon
Geneseo
Mount Morris
Dansville
Nunda
Portageville
Wellsville
Andover
Hornell
Canisteo
Arkport
Hammondsport
Bath
Corning
Painted Post
Addison
Elmira
Horseheads
Watkins Glen
Montour Falls
Seneca Falls
Auburn
Skaneateles
Marcellus
Onondaga
Syracuse
Baldwinsville
Fulton
Oswego
Mexico
Pulaski
Sandy Creek
Adams
Watertown
Carthage
Lowville
Boonville
Rome
Utica
Oneida
Canastota
Cazenovia
Hamilton
Morrisville
Norwich
Oxford
Sherburne
Oneonta
Cooperstown
Richfield Springs
Little Falls
Herkimer
Ilion
Frankfort
Mohawk
Amsterdam
Johnstown
Gloversville
Fonda
Canajoharie
Schoharie
Middleburgh
Cobleskill
Sharon Springs
Schenectady
Scotia
Albany
Troy
Cohoes
Waterford
Rensselaer
Hudson
Catskill
Coxsackie
Athens
Kingston
Saugerties
Rhinebeck
Red Hook
Tivoli
Germantown
Hudson
Chatham
Kinderhook
Valatie
Stuyvesant
Stuyvesant Falls
Philmont
Hillsdale
Copake
Ancram
Millerton
Pine Plains
Amenia
Dover Plains
Wassaic
Poughkeepsie
Hyde Park
Staatsburg
Rhinebeck
Millbrook
Pawling
Wappingers Falls
Fishkill
Beacon
Newburgh
Cornwall
Monroe
Harriman
Tuxedo
Sloatsburg
Suffern
Ramapo
Mahwah
Ringwood
Oakland
Wanaque
Pompton Lakes
Pompton Plains
Wayne
Paterson
Clifton
Passaic
Hackensack
Rutherford
East Rutherford
Lyndhurst
Kearny
Harrison
Jersey City
Hoboken
Weehawken
Union City
West New York
North Bergen
Secaucus
Guttenberg
Fairview
Cliffside Park
Edgewater
Fort Lee
Ridgefield
Ridgefield Park
Teaneck
Englewood
Tenafly
Bergenfield
Dumont
Hackensack
Paramus
Ridgewood
Glen Rock
Wyckoff
Franklin Lakes
Oakland
Mahwah
Ramsey
Allendale
Waldwick
Saddle River
Upper Saddle River
Montvale
Woodcliff Lake
Park Ridge
Hillsdale
Old Tappan
Norwood
Closter
Cresskill
Demarest
Haworth
Alpine
Tenafly
Englewood Cliffs
Leonia
Palisades Park
Ridgefield
Ridgefield Park
Teaneck
Englewood
Tenafly
Bergenfield
Dumont
Hackensack
Paramus
Ridgewood
Glen Rock
Wyckoff
Franklin Lakes
Oakland
Mahwah
Ramsey
Allendale
Waldwick
Saddle River
Upper Saddle River
Montvale
Woodcliff Lake
Park Ridge
Hillsdale
Old Tappan
Norwood
Closter
Cresskill
Demarest
Haworth
Alpine
Tenafly
Englewood Cliffs
Leonia
Palisades Park

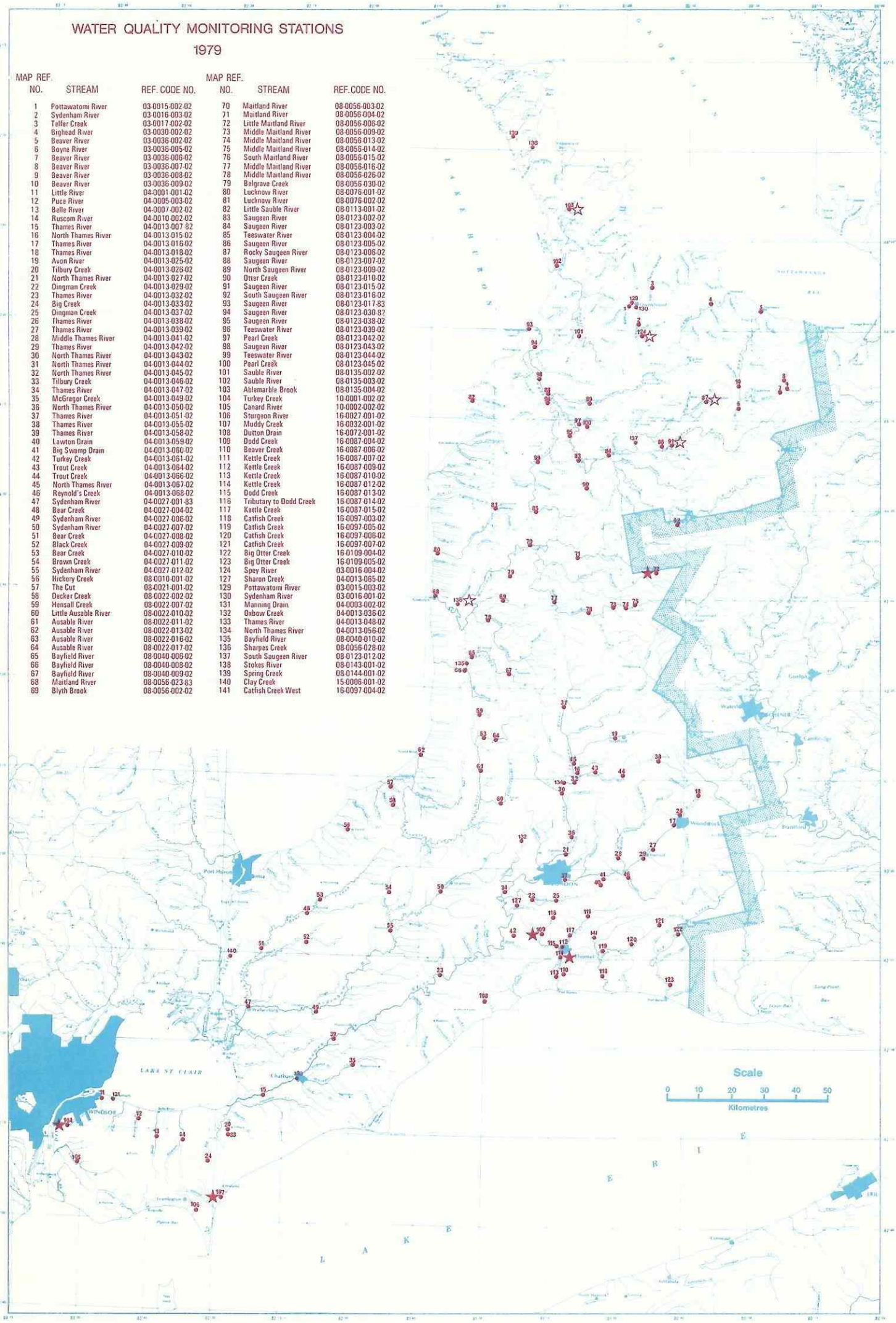

1973
MAY TO OCTOBER
FILTERED REACTIVE PHOSPHORUS
LEGEND
<.007 mg/l
.008–.017 mg/l
.018 – .039 mg/l
.040 – .100 mg/l
>.101 mg/l
best stations
poorest stations
LAKE HURON
GEORGIAN BAY
NOTTAWASAGA BAY
LAKE ST. CLAIR
LAKE ERIE
Guelph
Waterloo
KITCHENER
Cambridge
Woodstock
Brantford
Port Huron
Sarnia
LONDON
St. Thomas
Chatham
WINDSOR
Brampton
Georgetown
Pigeon Bay
Long Point Bay
Inner Bay
Ashtabula
Conneaut
ERIE
Scale
0 10 20 30 40 50
Kilometres

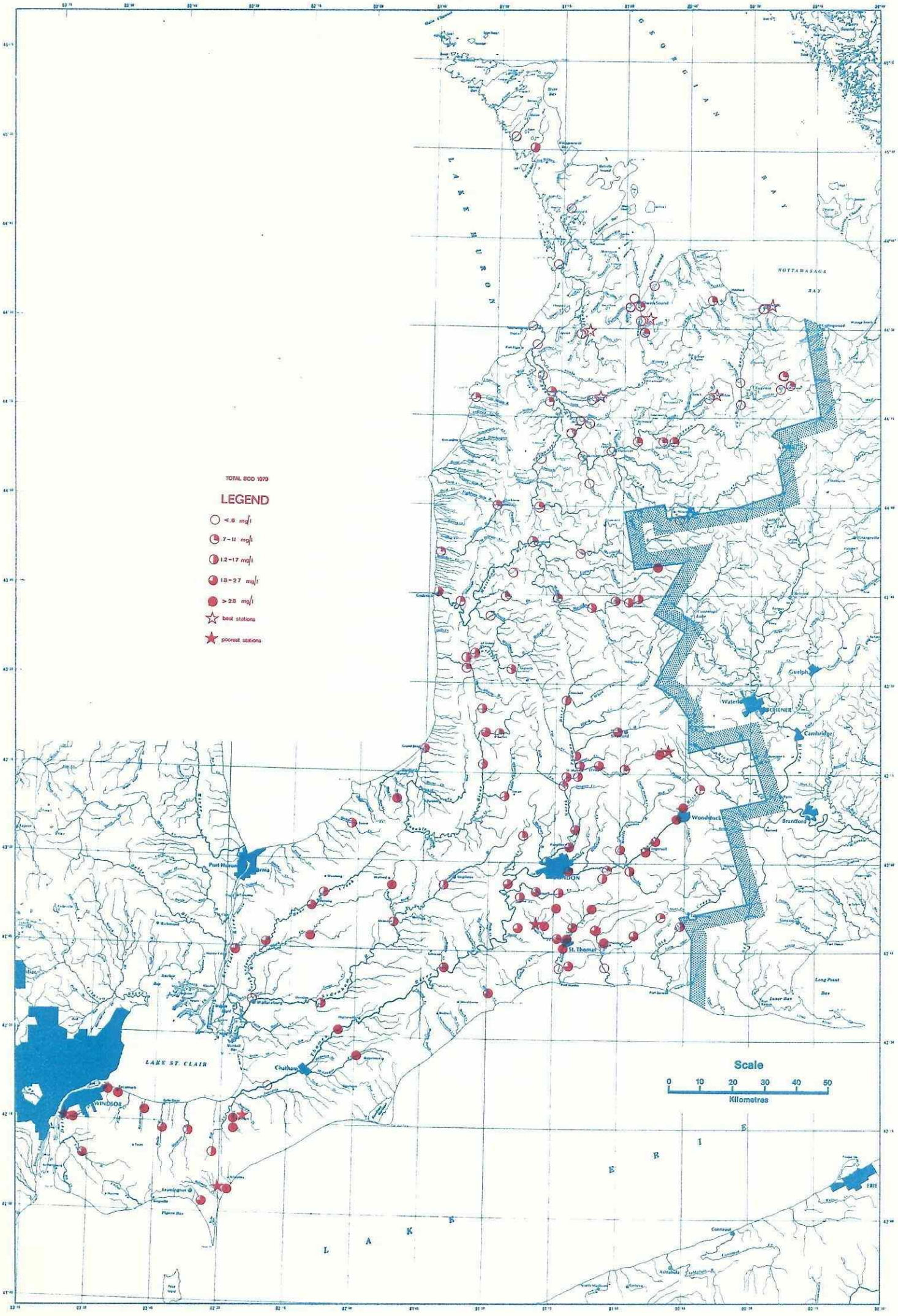
WATER QUALITY MONITORING STATIONS

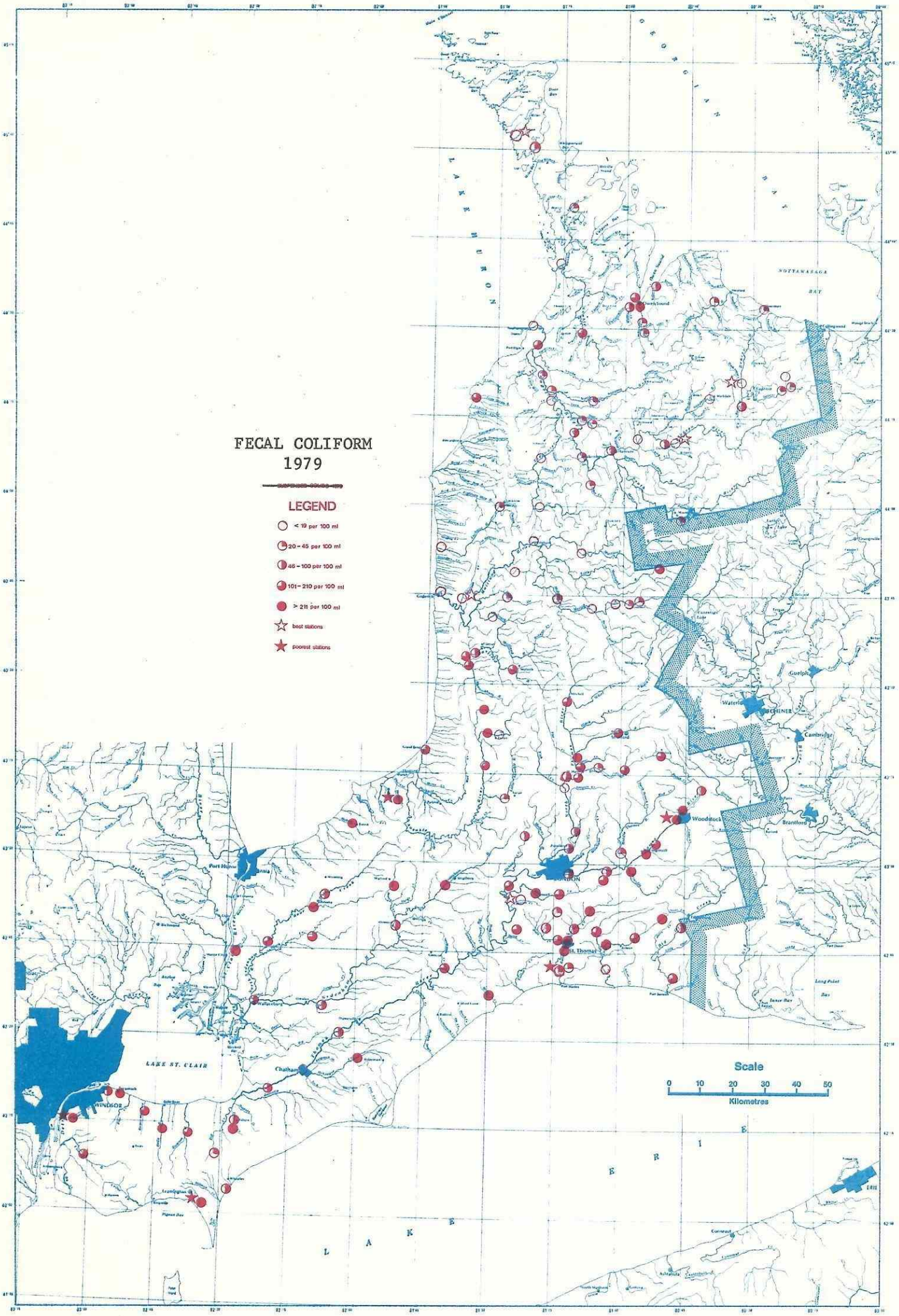
1979

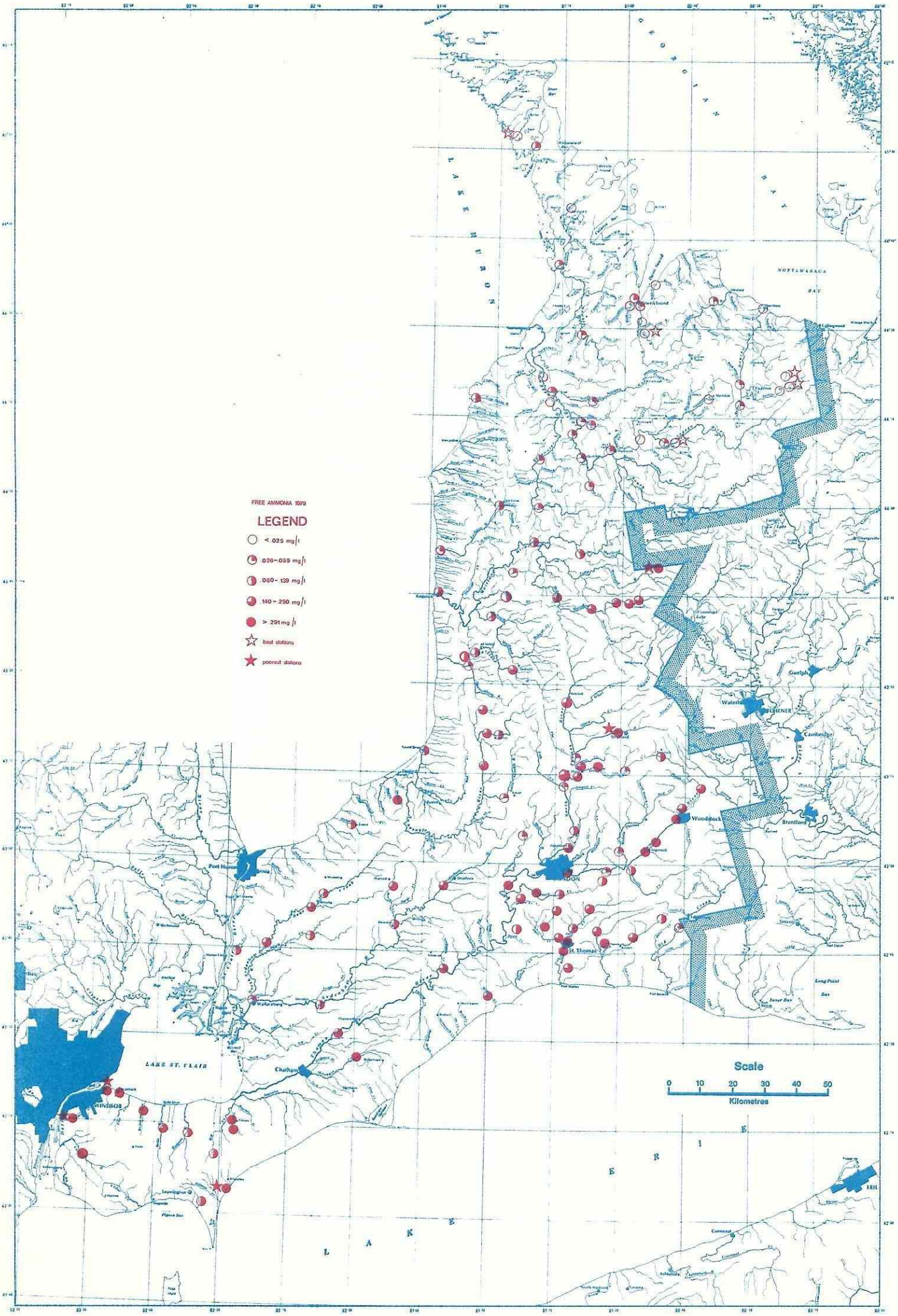
MAP REF. NO.	STREAM	REF. CODE NO.
1	Pottawatomi River	03-0015-002-02
2	Sydenham River	03-0016-003-02
3	Telfer Creek	03-0017-002-02
4	Bighead River	03-0030-002-02
5	Beaver River	03-0036-002-02
6	Boyne River	03-0036-005-02
7	Beaver River	03-0036-006-02
8	Beaver River	03-0036-007-02
9	Beaver River	03-0036-008-02
10	Beaver River	03-0036-009-02
11	Little River	04-0001-001-02
12	Puce River	04-0005-003-02
13	Belle River	04-0007-002-02
14	Ruscom River	04-0010-002-02
15	Thames River	04-0013-007-82
16	North Thames River	04-0013-015-02
17	Thames River	04-0013-016-02
18	Thames River	04-0013-018-02
19	Avon River	04-0013-025-02
20	Tilbury Creek	04-0013-026-02
21	North Thames River	04-0013-027-02
22	Dingman Creek	04-0013-029-02
23	Thames River	04-0013-032-02
24	Big Creek	04-0013-033-02
25	Dingman Creek	04-0013-037-02
26	Thames River	04-0013-038-02
27	Thames River	04-0013-039-02
28	Middle Thames River	04-0013-041-02
29	Thames River	04-0013-042-02
30	North Thames River	04-0013-043-02
31	North Thames River	04-0013-044-02
32	North Thames River	04-0013-045-02
33	Tilbury Creek	04-0013-046-02
34	Thames River	04-0013-047-02
35	McGregor Creek	04-0013-049-02
36	North Thames River	04-0013-050-02
37	Thames River	04-0013-051-02
38	Thames River	04-0013-055-02
39	Thames River	04-0013-058-02
40	Lawton Drain	04-0013-059-02
41	Big Swamp Drain	04-0013-060-02
42	Turkey Creek	04-0013-061-02
43	Trout Creek	04-0013-064-02
44	Trout Creek	04-0013-066-02
45	North Thames River	04-0013-067-02
46	Reynold's Creek	04-0013-068-02
47	Sydenham River	04-0027-001-83
48	Bear Creek	04-0027-004-02
49	Sydenham River	04-0027-006-02
50	Sydenham River	04-0027-007-02
51	Bear Creek	04-0027-008-02
52	Black Creek	04-0027-009-02
53	Bear Creek	04-0027-010-02
54	Brown Creek	04-0027-011-02
55	Sydenham River	04-0027-012-02
56	Hickory Creek	08-0010-001-02
57	The Cut	08-0021-001-02
58	Decker Creek	08-0022-002-02
59	Hensall Creek	08-0022-007-02
60	Little Ausable River	08-0022-010-02
61	Ausable River	08-0022-011-02
62	Ausable River	08-0022-013-02
63	Ausable River	08-0022-016-02
64	Ausable River	08-0022-017-02
65	Bayfield River	08-0040-006-02
66	Bayfield River	08-0040-008-02
67	Bayfield River	08-0040-009-02
68	Maitland River	08-0056-023-83
69	Blyth Brook	08-0056-002-02

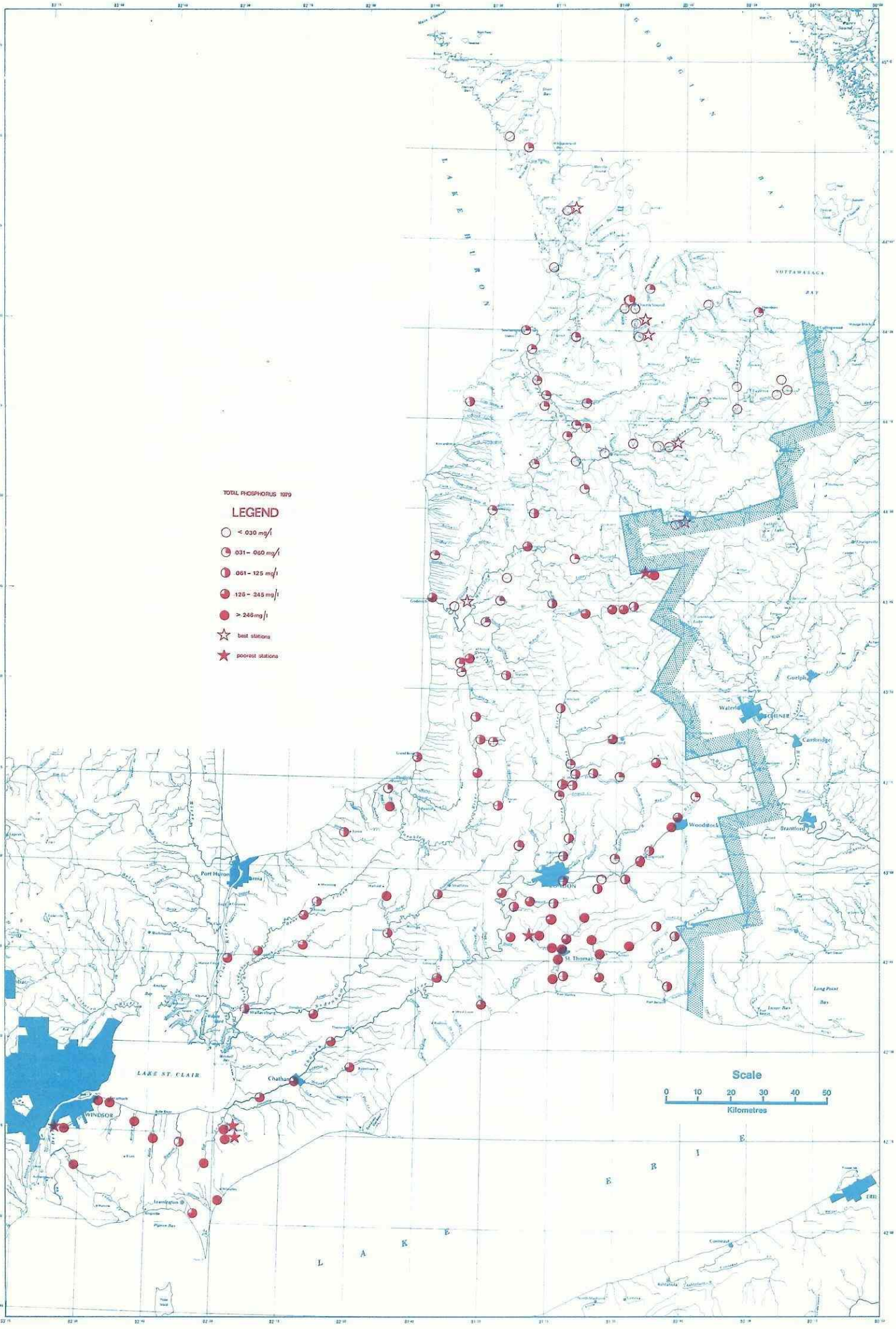
MAP REF. NO.	STREAM	REF.CODE NO.
70	Maitland River	08-0056-003-02
71	Maitland River	08-0056-004-02
72	Little Maitland River	08-0056-006-02
73	Middle Maitland River	08-0056-009-02
74	Middle Maitland River	08-0056-013-02
75	Middle Maitland River	08-0056-014-02
76	South Maitland River	08-0056-015-02
77	Middle Maitland River	08-0056-016-02
78	Middle Maitland River	08-0056-026-02
79	Belgrave Creek	08-0056-030-02
80	Lucknow River	08-0076-001-02
81	Lucknow River	08-0076-002-02
82	Little Sauble River	08-0113-001-02
83	Saugeen River	08-0123-002-02
84	Saugeen River	08-0123-003-02
85	Teeswater River	08-0123-004-02
86	Saugeen River	08-0123-005-02
87	Rocky Saugeen River	08-0123-006-02
88	Saugeen River	08-0123-007-02
89	North Saugeen River	08-0123-009-02
90	Otter Creek	08-0123-010-02
91	Saugeen River	08-0123-015-02
92	South Saugeen River	08-0123-016-02
93	Saugeen River	08-0123-017-83
94	Saugeen River	08-0123-030-82
95	Saugeen River	08-0123-038-02
96	Teeswater River	08-0123-039-02
97	Pearl Creek	08-0123-042-02
98	Saugeen River	08-0123-043-02
99	Teeswater River	08-0123-044-02
100	Pearl Creek	08-0123-045-02
101	Sauble River	08-0135-002-02
102	Sauble River	08-0135-003-02
103	Ablemarble Brook	08-0135-004-02
104	Turkey Creek	10-0001-002-02
105	Canard River	10-0002-002-02
106	Sturgeon River	16-0027-001-02
107	Muddy Creek	16-0032-001-02
108	Dutton Drain	16-0072-001-02
109	Dodd Creek	16-0087-004-02
110	Beaver Creek	16-0087-006-02
111	Kettle Creek	16-0087-007-02
112	Kettle Creek	16-0087-009-02
113	Kettle Creek	16-0087-010-02
114	Kettle Creek	16-0087-012-02
115	Dodd Creek	16-0087-013-02
116	Tributary to Dodd Creek	16-0087-014-02
117	Kettle Creek	16-0087-015-02
118	Catfish Creek	16-0097-003-02
119	Catfish Creek	16-0097-005-02
120	Catfish Creek	16-0097-006-02
121	Catfish Creek	16-0097-007-02
122	Big Otter Creek	16-0109-004-02
123	Big Otter Creek	16-0109-005-02
124	Spey River	03-0016-004-02
127	Sharon Creek	04-0013-065-02
129	Pottawatomi River	03-0015-003-02
130	Sydenham River	03-0016-001-02
131	Manning Drain	04-0003-002-02
132	Oxbow Creek	04-0013-036-02
133	Thames River	04-0013-048-02
134	North Thames River	04-0013-056-02
135	Bayfield River	08-0040-010-02
136	Sharpes Creek	08-0056-028-02
137	South Saugeen River	08-0123-012-02
138	Stokes River	08-0143-001-02
139	Spring Creek	08-0144-001-02
140	Clay Creek	15-0006-001-02
141	Catfish Creek West	16-0097-004-02

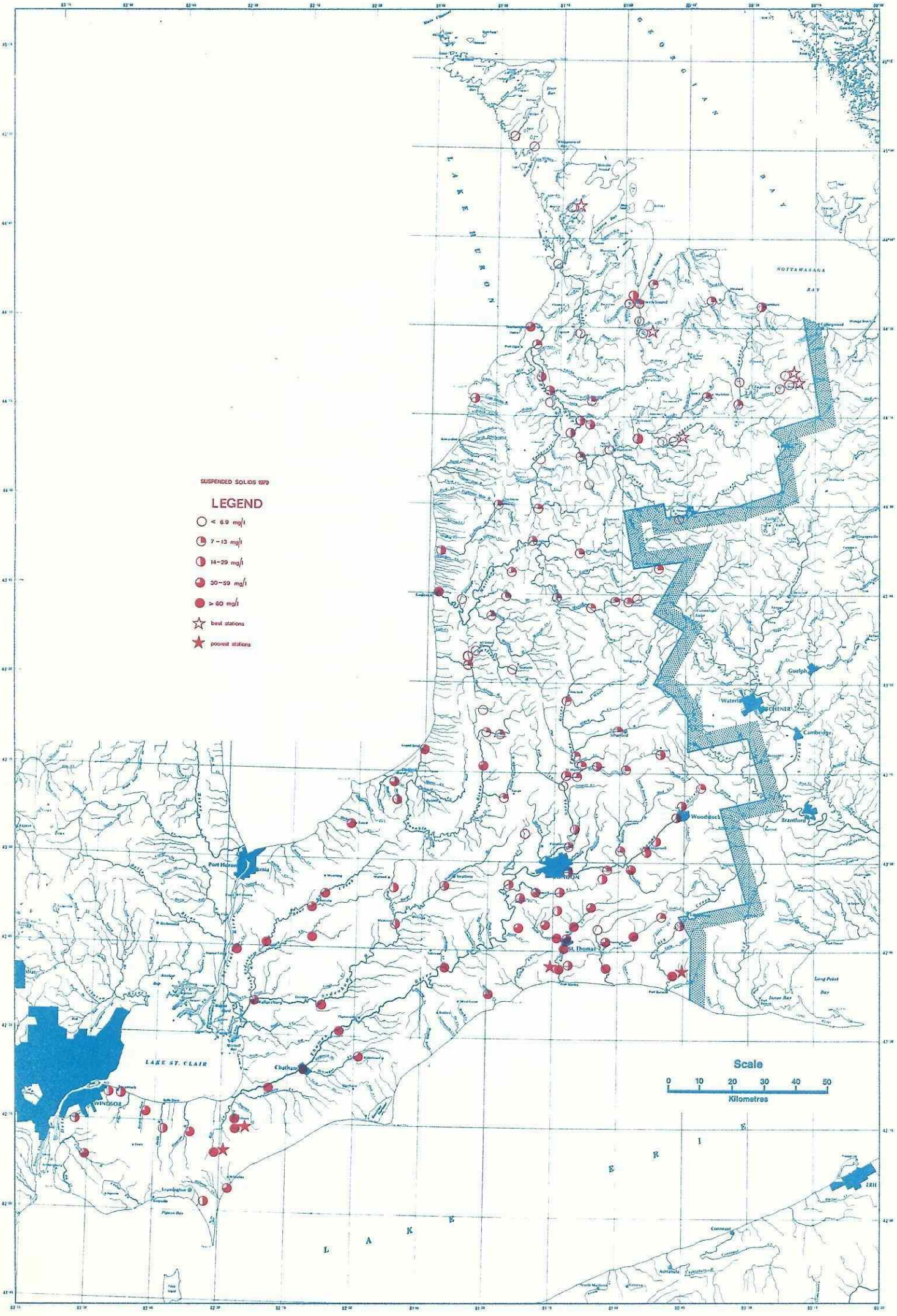


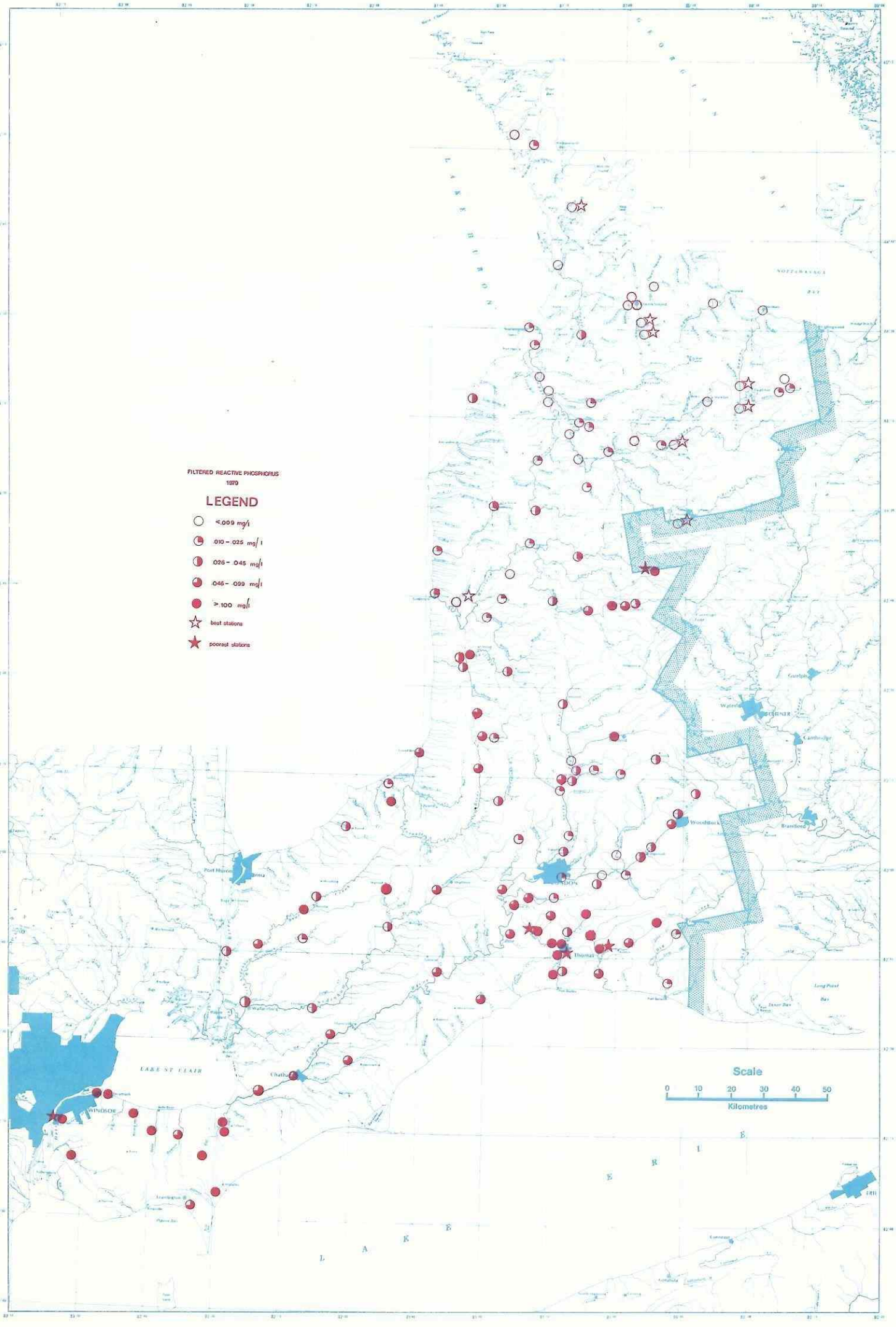

TOTAL BOD 1979
LEGEND
< 6 mg/l
7 - 11 mg/l
12 - 17 mg/l
18 - 27 mg/l
> 28 mg/l
best stations
poorest stations
LAKE HURON
GEORGIAN BAY
NOTTAWASAGA BAY
LAKE ST. CLAIR
LAKE ERIE
WINDSOR
Chatham
Port Huron
LONDON
St. Thomas
Woodstock
Brantford
Guelph
Waterloo
KITCHENER
Cambridge
ERIE
Long Point Bay
Inner Bay
Scale
0 10 20 30 40 50
Kilometres

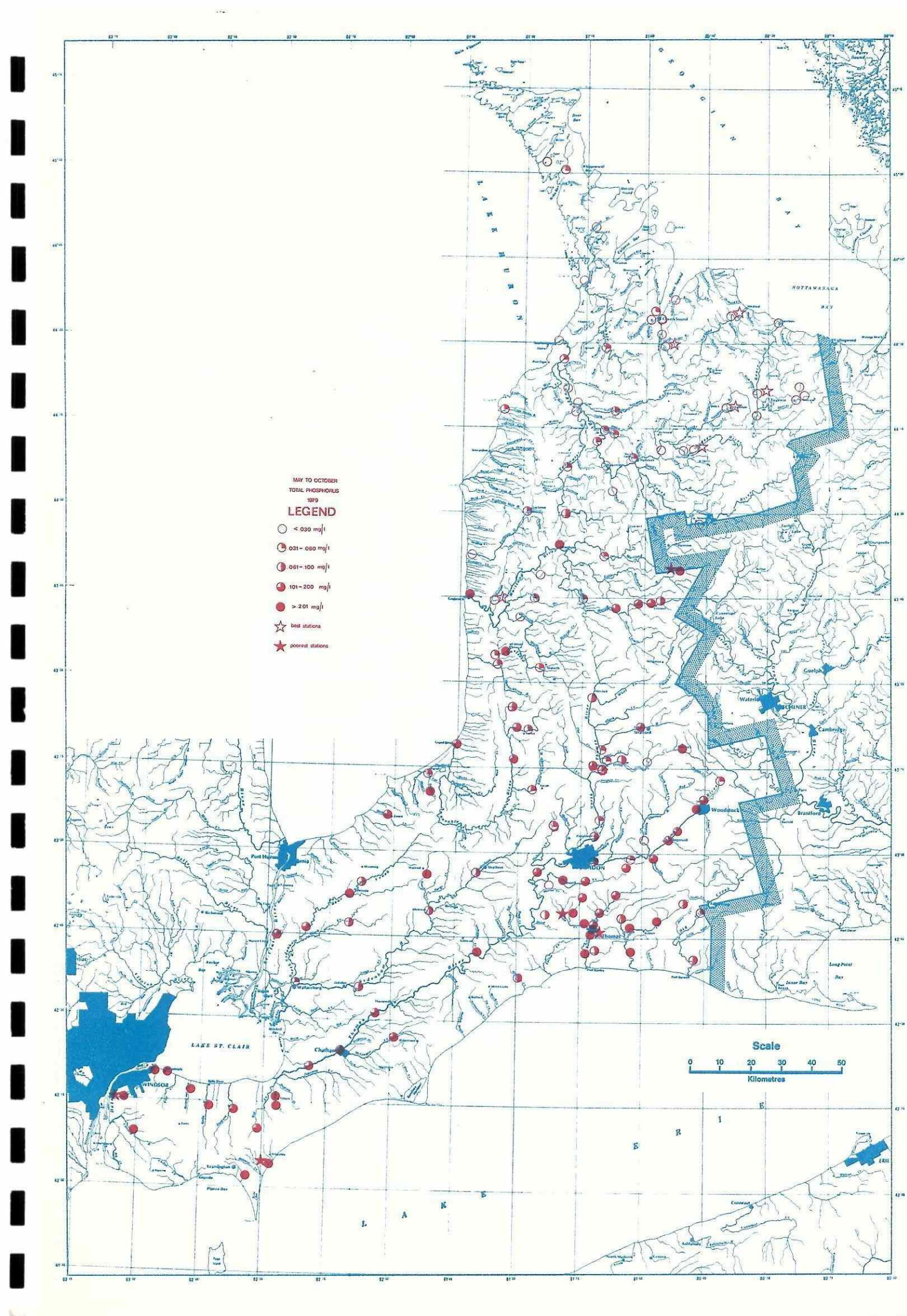

FECAL COLIFORM
1979
LEGEND
< 19 per 100 ml
20 - 45 per 100 ml
46 - 100 per 100 ml
101 - 210 per 100 ml
> 211 per 100 ml
best stations
poorest stations
Scale
0 10 20 30 40 50
Kilometres
LAKE ST. CLAIR
LAKE ERIE
WINDSOR
Chatham
St. Thomas
Woodstock
Brantford
Guelph
Cambridge
KITCHENER
Waterloo
Owen Sound
NOTTAWASAGA BAY
GEORGIAN BAY
HURON

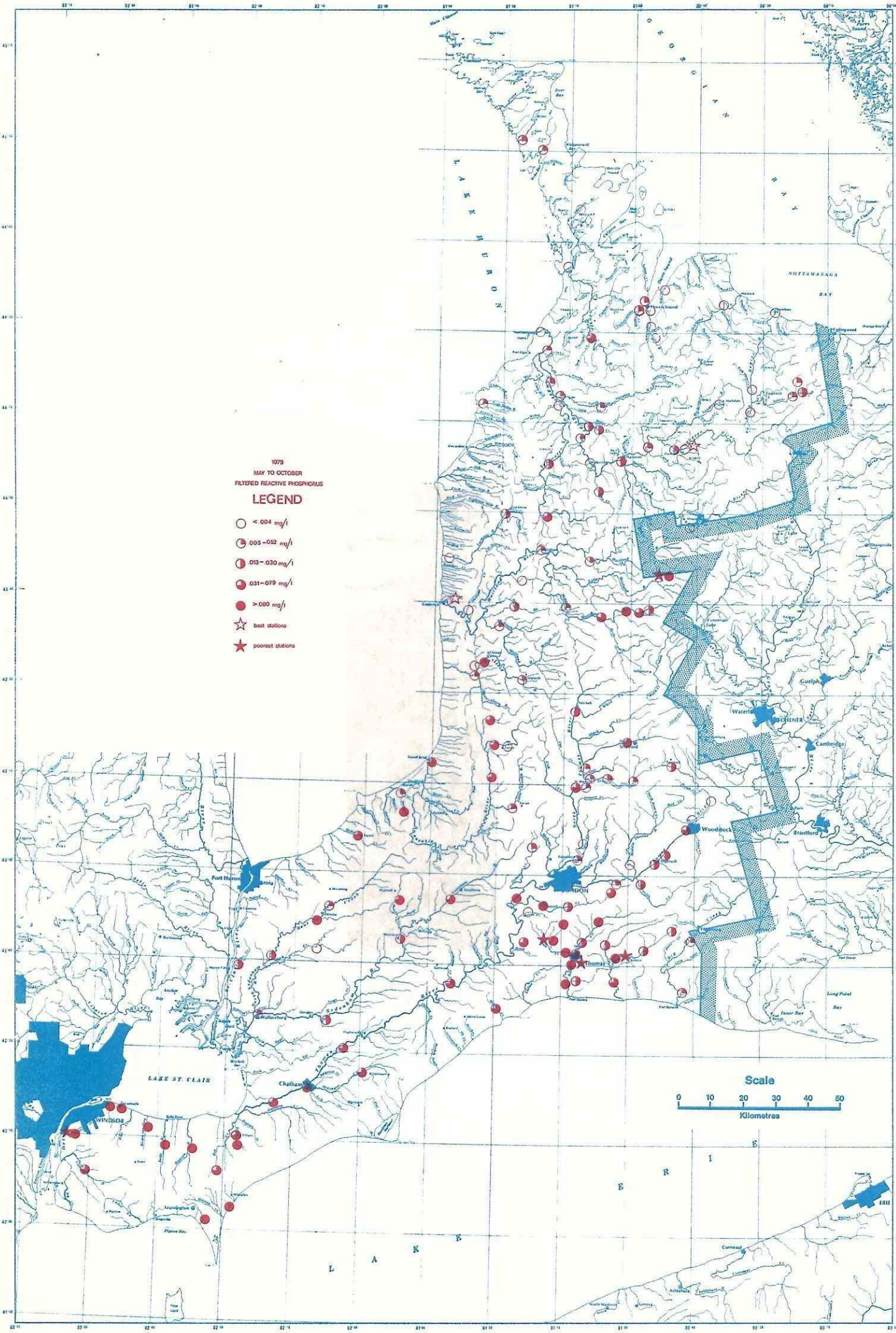

FREE AMMONIA 1979
LEGEND
< .025 mg/l
.026 - .059 mg/l
.060 - .139 mg/l
.140 - .290 mg/l
> .291 mg/l
best stations
poorest stations
Scale
0 10 20 30 40 50
Kilometres
LAKE ST. CLAIR
LAKE ERIE
GEORGIAN BAY
NOTTAWASAGA BAY
WINDSOR
Chatham
Port Huron
LONDON
St. Thomas
Woodstock
Brantford
Guelph
Waterloo
KITCHENER
Cambridge
ERIE

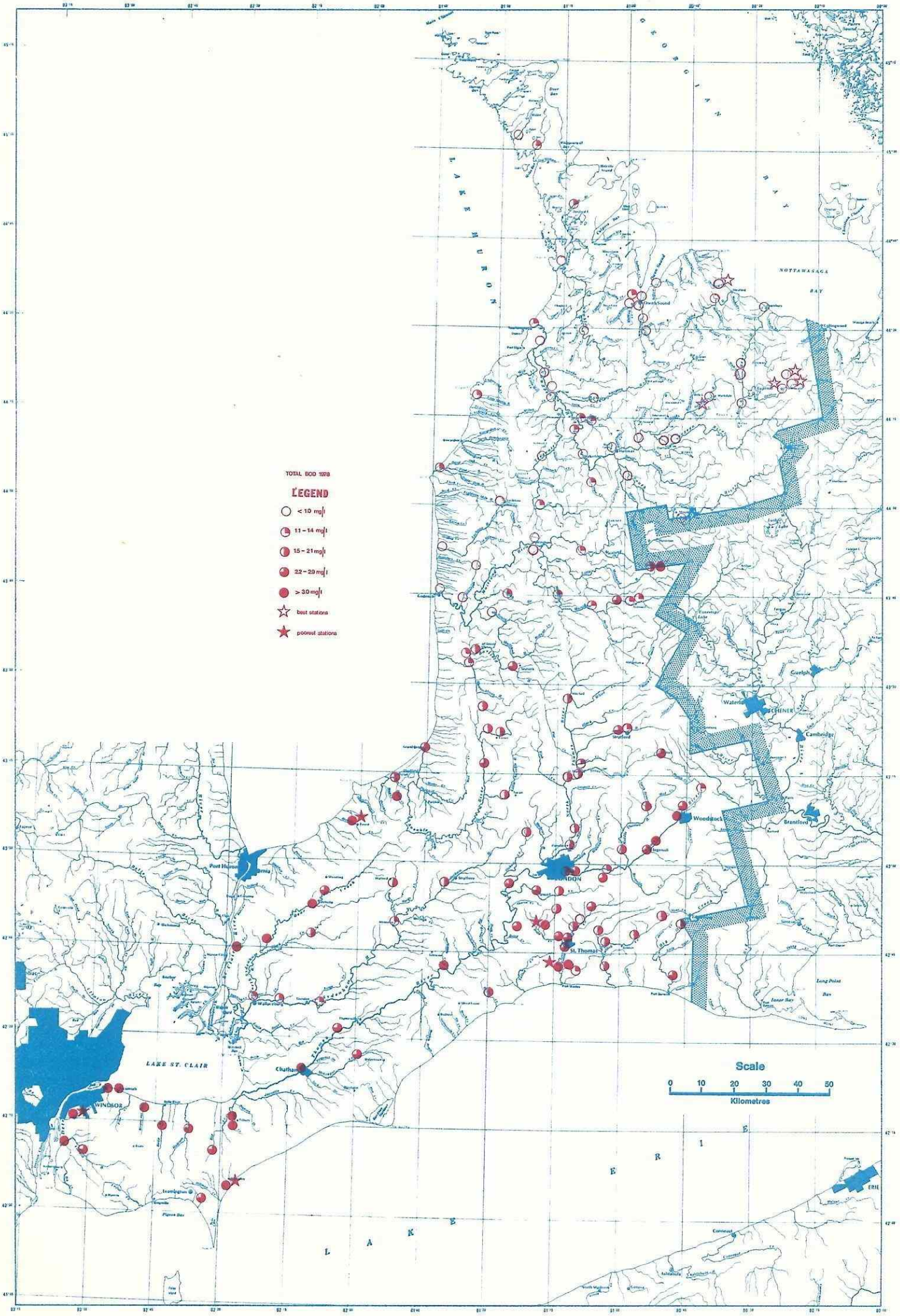

TOTAL PHOSPHORUS 1979
LEGEND
< .030 mg/l
.031 – .060 mg/l
.061 – .125 mg/l
.126 – .245 mg/l
> .246 mg/l
best stations
poorest stations
Scale
0 10 20 30 40 50
Kilometres
LAKE ST. CLAIR
LAKE ERIE
GEORGIAN BAY
NOTTAWASAGA BAY
Long Point Bay
Port Huron
Sarnia
WINDSOR
Chatham
St. Thomas
Woodstock
Brantford
Guelph
Waterloo
Cambridge
KITCHENER
ERIE


SUSPENDED SOLIDS 1979
LEGEND
< 6.9 mg/l
7 – 13 mg/l
14 – 29 mg/l
30 – 59 mg/l
> 60 mg/l
best stations
poorest stations
LAKE HURON
GEORGIAN BAY
NOTTAWASAGA BAY
LAKE ST. CLAIR
LAKE ERIE
WINDSOR
Chatham
Port Huron
LONDON
St. Thomas
KITCHENER
Waterloo
Guelph
Cambridge
Woodstock
Brantford
ERIE
Conneaut
Long Point Bay
Scale
0 10 20 30 40 50
Kilometres


FILTERED REACTIVE PHOSPHORUS
1970
LEGEND
<.009 mg/l
.010 - .025 mg/l
.026 - .045 mg/l
.046 - .099 mg/l
>.100 mg/l
best stations
poorest stations
Scale
0 10 20 30 40 50
Kilometres
LAKE ST CLAIR
WINDSOR
Chatham
Port Huron
Sarnia
Thomas
Woodstock
Brantford
Guelph
Waterloo
KITCHENER
Cambridge
Long Point Bay
Inner Bay
NOTTAWASAGA
BAY
LAKE ERIE


MAY TO OCTOBER
TOTAL PHOSPHORUS
1979
LEGEND
< 030 mg/l
031 - 060 mg/l
061 - 100 mg/l
101 - 200 mg/l
> 201 mg/l
best stations
poorest stations
LAKE HURON
GEORGIAN BAY
NOTTAWASAGA BAY
LAKE ST. CLAIR
WINDSOR
Chatham
Guelph
Waterloo
KITCHENER
Cambridge
Woodstock
Brantford
Port Huron
Sarnia
LONDON
Long Point Bay
Inner Bay
ERIE
Scale
0 10 20 30 40 50
Kilometres


1979
MAY TO OCTOBER
FILTERED REACTIVE PHOSPHORUS
LEGEND
<.004 mg/l
.005 - .012 mg/l
.013 - .030 mg/l
.031 - .079 mg/l
>.080 mg/l
best stations
poorest stations
LAKE HURON
GEORGIAN BAY
NOTTAWASAGA BAY
LAKE ST. CLAIR
LAKE ERIE
WINDSOR
Chatham
Port Huron
LONDON
Thomas
Woodstock
Brantford
Cambridge
KITCHENER
Waterloo
Guelph
Long Point Bay
Tanor Bay
Erieau
Scale
0 10 20 30 40 50
Kilometres


TOTAL BOD 1978
LEGEND
< 10 mg/l
11 – 14 mg/l
15 – 21 mg/l
22 – 29 mg/l
> 30 mg/l
best stations
poorest stations
LAKE HURON
GEORGIAN BAY
NOTTAWASAGA BAY
LAKE ST. CLAIR
LAKE ERIE
Guelph
Waterloo
KITCHENER
Cambridge
Woodstock
Brantford
LONDON
St. Thomas
Port Huron
Chatham
WINDSOR
Leamington
ERIE
Long Point Bay
Scale
0 10 20 30 40 50
Kilometres